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EX PARTE OR LATE FILED

September 18, 1996

RECEIVED

SEP 18 1996

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, DC 20554

Re: Ex parte presentation in RM-8811, ET Docket No. 95-183, RM-8553, PP Docket No. 93-253, ET Docket No. 94-124, RM-8308

Dear Mr. Caton:

Pursuant to Section 1.1206 of the Commission's rules and regulations, Motorola Satellite Communications, Inc. ("Motorola") hereby reports that an ex parte presentation was made on April 16, 1996 by representatives of Motorola to the following:

Karl Kensinger	International Bureau
Ruth Milkman	International Bureau
Harold J. Ng	International Bureau
Kathleen O'Brian Ham	Wireless Telecommunications Bureau
David E. Horowitz	Wireless Telecommunications Bureau
Sonia Greenaway	Wireless Telecommunications Bureau
Robert James	Wireless Telecommunications Bureau
Susan E. Magnotti	Wireless Telecommunications Bureau
Nancy Markowitz	Wireless Telecommunications Bureau
D'wana Speight	Wireless Telecommunications Bureau
Thomas P. Stanley	Wireless Telecommunications Bureau
Steve Sharkey	Office of Engineering and Technology

In that presentation the Motorola representatives distributed and discussed the attached document, which sets forth Motorola's position regarding frequency bands that are at issue in the above-captioned proceedings. Three originals and three

No. of Copies rec'd 0+5
List ABCDE

copies of this letter are being submitted for inclusion in the above-referenced dockets.

Sincerely,

Pantelis Michalopoulos
Attorney for Motorola Satellite Communications, Inc.

Attachment

cc: Karl Kensinger
Ruth Milkman
Harold J. Ng
Kathleen O'Brian Ham
David E. Horowitz
Sonia Greenaway
Robert James
Susan E. Magnotti
Nancy Markowitz
D'wana Speight
Thomas P. Stanley
Steve Sharkey

MOTOROLA
Satellite Communications Division

The M-Star System

A Global Network of Non-Geostationary Communications Satellites Providing Broadband Services in the 40 GHz Band

Filed 4 September 1996 by:

Motorola Satellite Systems, Inc.

Introduction

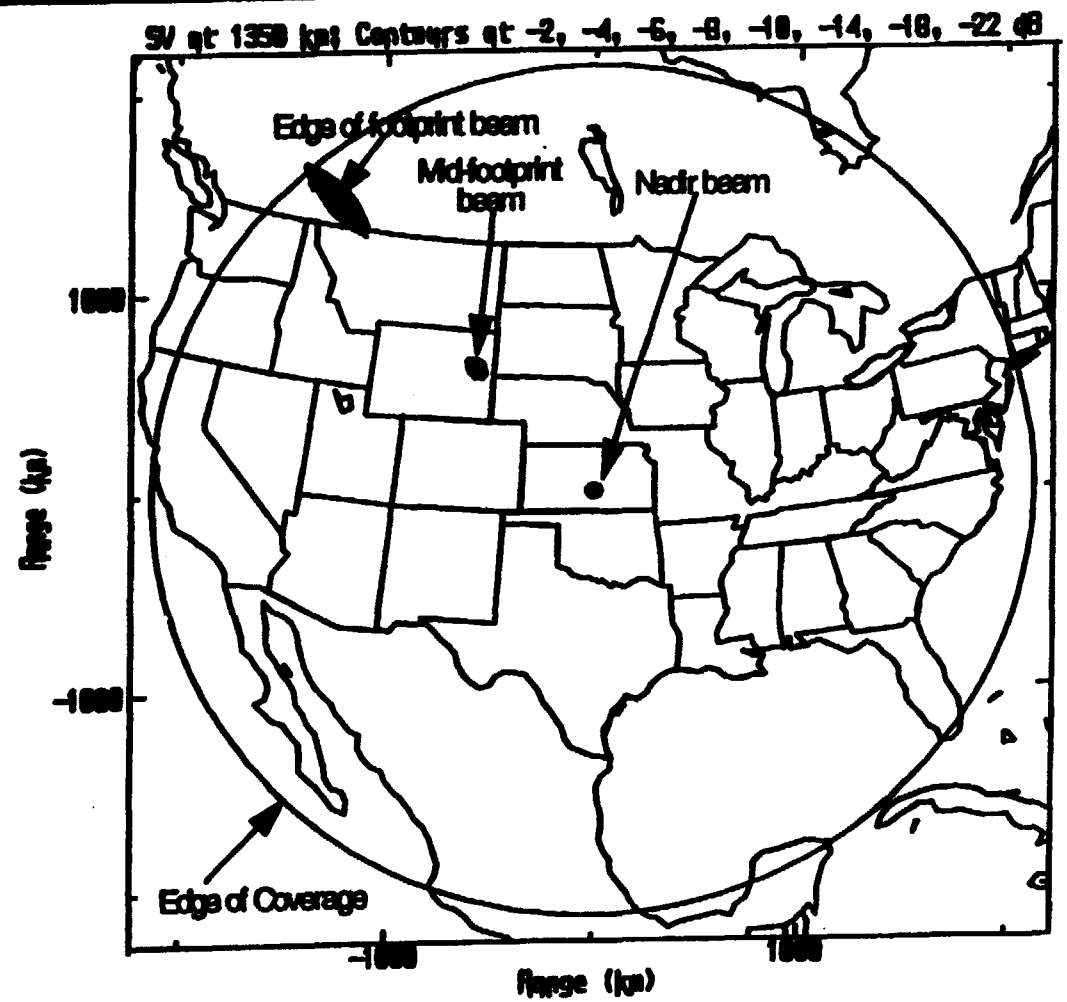
- M-Star System
- M-Star Frequency Selection
- Sharing with Fixed Service

M-Star System Description

- Non-GSO Global satellite system comprising 72 satellites.
- Real-time wide-band information transfer
  - ⇒ Voice, Data, Digital Video, and Audio.
  - ⇒ Covering protocols such as ISDN, Frame Relay, X.25, TCP/IP, ATM, FDDI, and OC-1.
- Data rates from 2.048 Mbps to 51.84 Mbps.

72 Satellite Constellation

- 12 planes with 6 satellites per plane
- 47 degree inclination
- Circular orbit at altitude of 1350 km (839 mi.)
- Minimum elevation angle is 22 degrees
- Coverage between ±57 degrees Latitude
- Double or triple coverage between ±55 degrees Latitudes (most all major urban areas).



M-Star Spectrum Plan

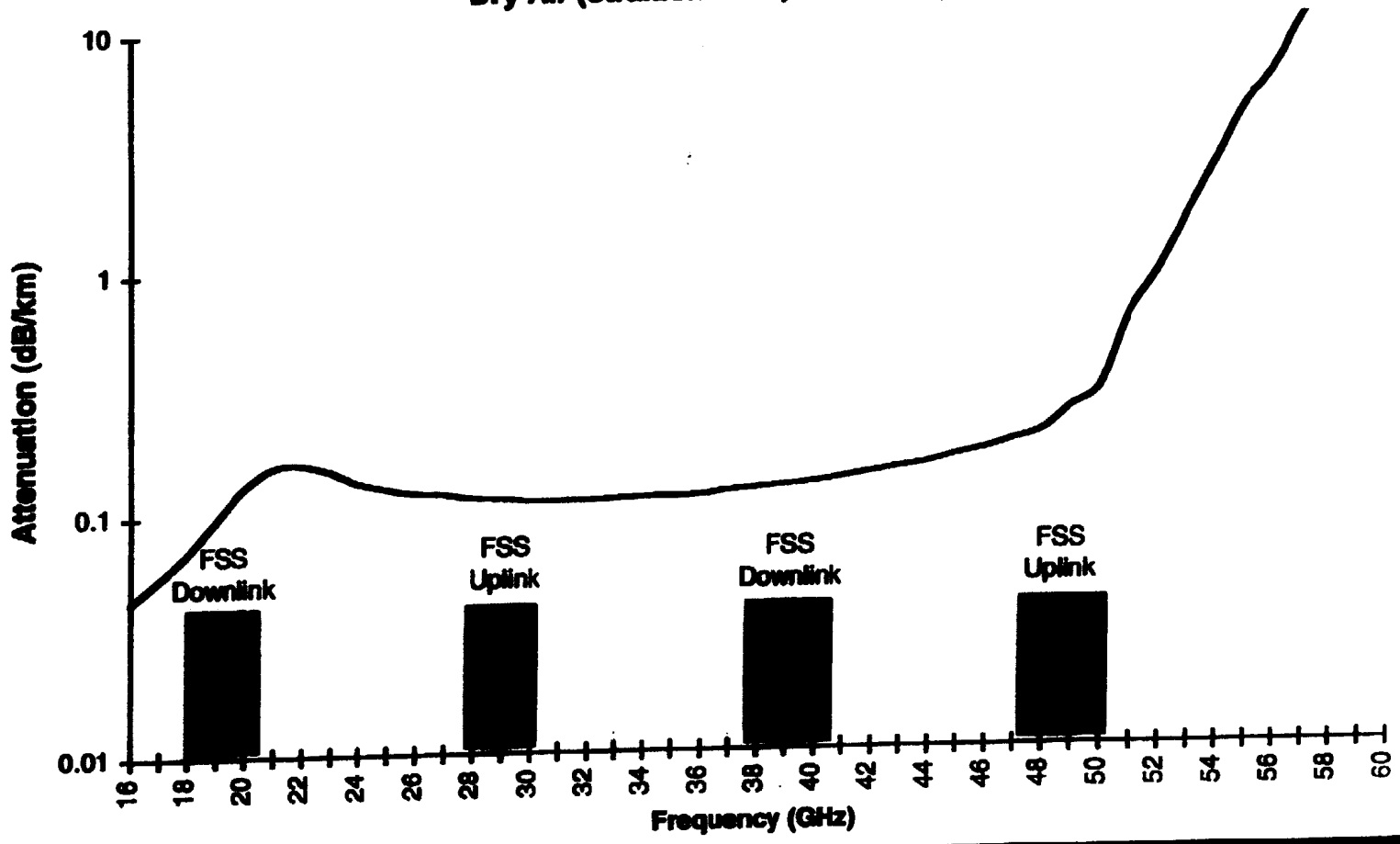
- **Service Links:**
  - 37.5 - 40.5 GHz (Space-to-Earth)
  - 47.2 - 50.2 GHz (Earth-to-Space)
- **Inter-Satellite Links:**
  - 59.0 - 64.0 GHz
- **TT&C Links will operate in the service link band**
  - ⇒ Launch and emergency operations in FSS band below 18 GHz

Frequency Selection

- The 40 GHz band is the last usable band for Satellite communication networks.
- Motorola started investigating the 40 GHz band over a year ago, when it became evident that the 28 GHz band will be fully utilized.
- Motorola commissioned a study by the Joint Spectrum Center (JSC) to characterize the electromagnetic environment in the bands above 29.5 GHz.

Atmospheric Absorption

Dry Air (Strallon et al., 1960 IEEE)



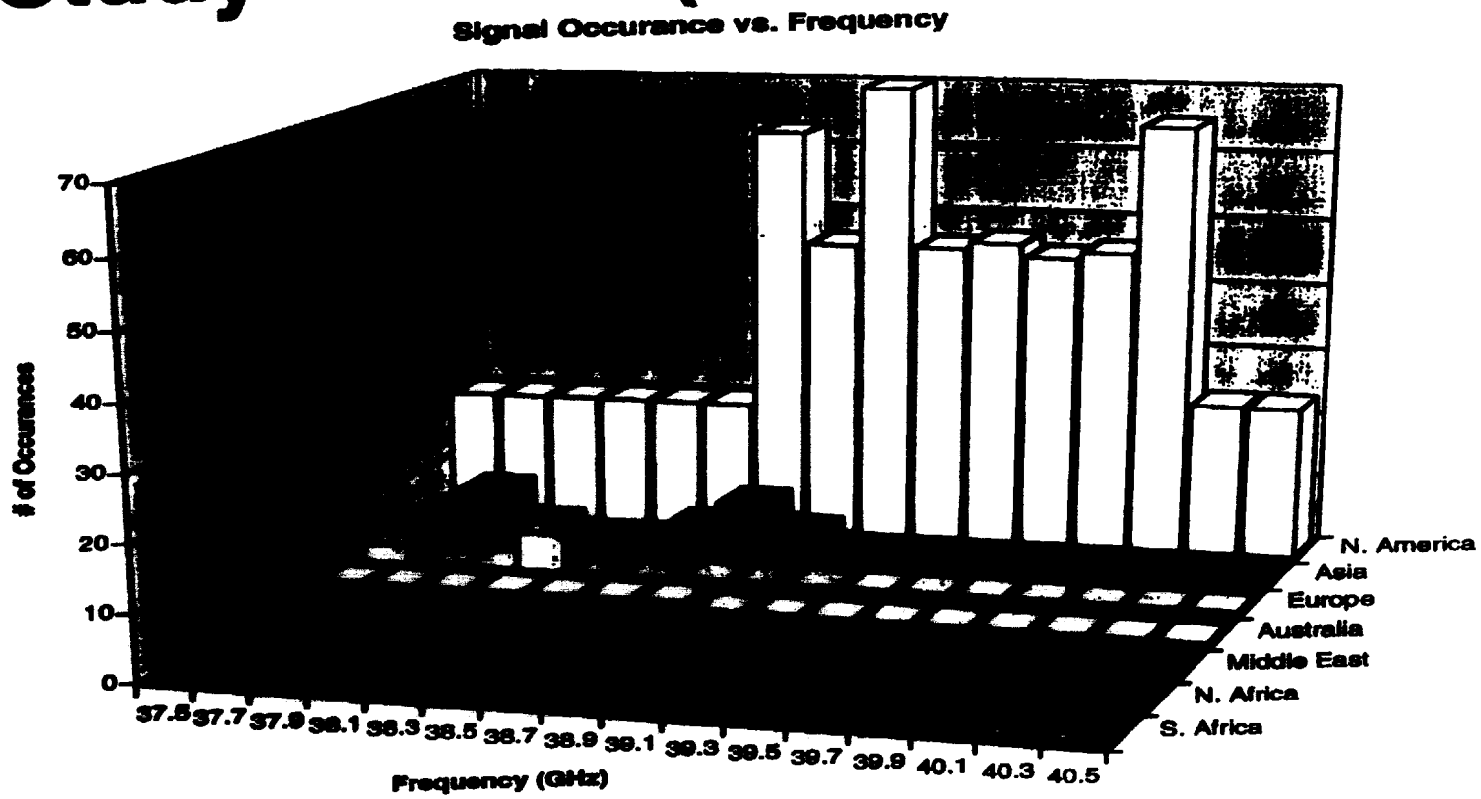
Study Approach

- Characterize the worldwide use of the frequency band 29.5 - 60.0 GHz.
- Give indications of the use in the following geographical regions:
  - Asia
  - Australia/Oceania
  - Europe
  - Middle East
  - N. America
  - N. Africa
  - Sub-Saharan Africa
- Develop a histogram of frequency use for each region.

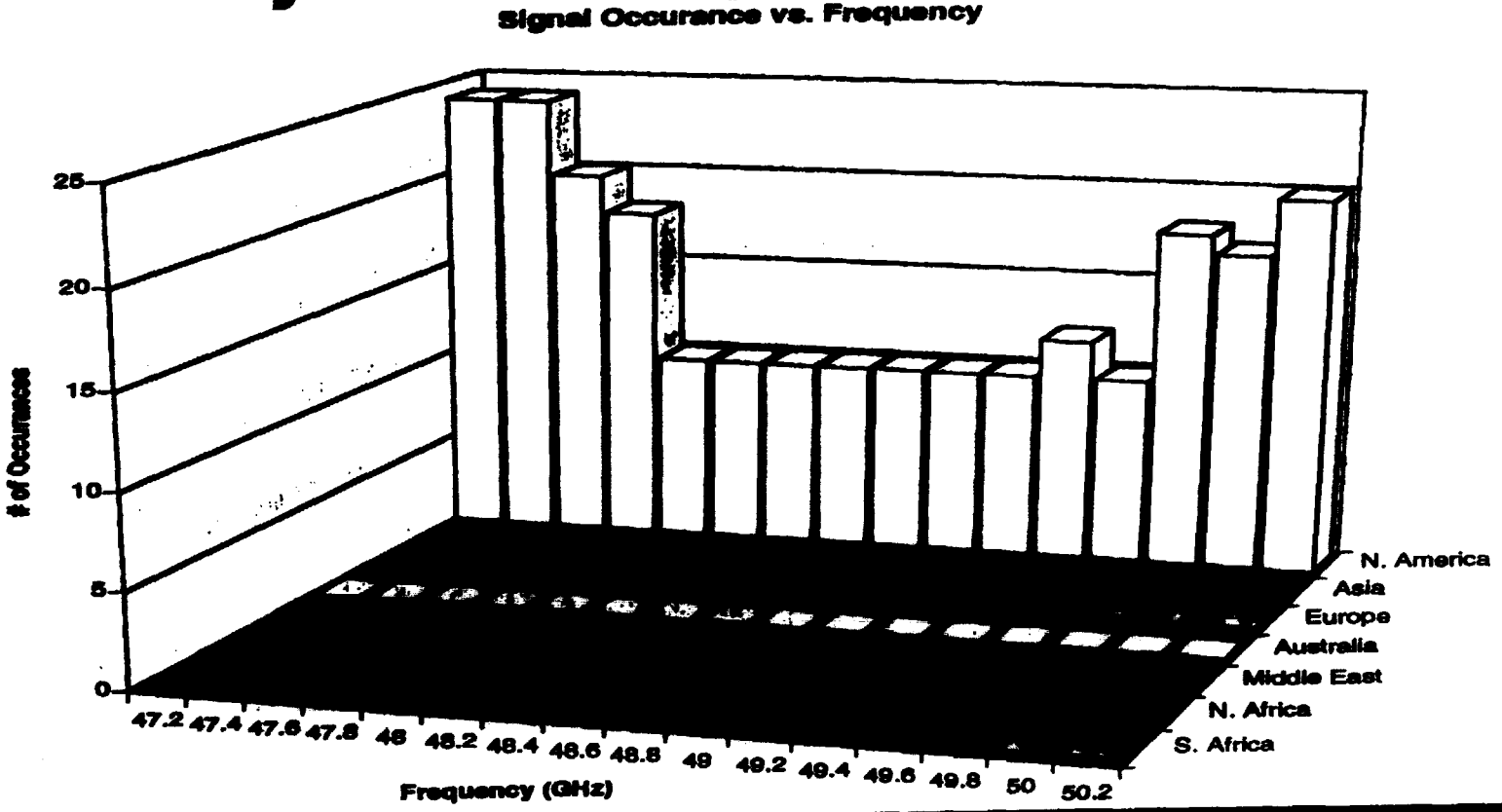
Study Results

- Usage in these bands is almost non-existent outside of North America.
- Small usage with North America results in relatively few coordinations.
- Overall result is the band 37.5 - 40.5 GHz and 47.2 - 50.2 GHz are well suited as a global band for Fixed Satellite Service (as allocated).

Study Results (37.5 - 40.5 GHz)



Study Results (47.2 - 50.2 GHz)



Sharing with Fixed Service

- **M-Star into Fixed Service**
  - ⇒ 37.5 - 40.5 GHz band (Sharing with Satellites).
  - ⇒ 47.2 - 50.2 GHz band (Sharing with Earth Stations).
- **Fixed Service interference into M-Star**
  - ⇒ 37.5 - 40.5 GHz band (Sharing with Earth Stations).
  - ⇒ 47.2 - 50.2 GHz band (Sharing with Satellites).

M-Star Satellites into FS (37.5 - 40.5 GHz)

- **M-Star is below 47 CFR 25.208(c) PFD limits**
- **Assumptions for Fixed Service links**
  - Receive gain = 47 dBi
  - Receive Noise Temp. = 1000 K

FS Elevation Angle (deg)	Peak Io/No (dB)
0	-42.3
5	-39.5
10	-35.7
15	-29.9
20	-16.3

FS into M-Star Earth Stations (37.5 - 40.5 GHz)

- Have requested data on Fixed Service terminals.
- We believe low power Fixed Service terminals with power control can be shared without coordination.
- High power terminals or terminals without power control must be coordinated.

M-Star Earth Stations into FS (47.2 - 50.2 GHz)

- M-Star is below EIRP limits of 47 CFR 25.204(b)
- Maximum required separation distance for Io/No to be below -13 dB (5% rise in noise floor) is 36.6 km for Fixed Service main beam interactions.
- For backlobe interactions required separation distance is 380 m.

FS into M-Star Satellites (47.2 - 50.2 GHz)

- Sharing will not be a problem.
- Due to:
  - ⇒ Low elevation angles of Fixed Service.
  - ⇒ High elevation angles of M-Star (>22 deg.)
  - ⇒ Typical Fixed Service links will have transmit EIRP lower that that of M-Star Earth Stations.
  - ⇒ Atmospheric attenuation at this frequency.

Sharing with Other FSS Services

- M-Star system is designed to employ satellite diversity (Multiple satellites in view of Earth station).
  - ⇒ Sharing with NGSO systems - Not a problem if both systems employ satellite diversity for mitigation.
  - ⇒ Sharing with GSO systems - M-Star will need to use satellite diversity to allow sharing with GSO systems.

Conclusions

- 37.5 - 40.5 GHz
  - ⇒ Satellite to Fixed Service - No sharing problems.
  - ⇒ Fixed Service to Earth Station - Coordination not required for low power system employing power control, otherwise coordinate.
- 47.2 - 50.2 GHz
  - ⇒ Earth Station to Fixed Service - Needs to be coordinated.
  - ⇒ Fixed Service to Satellite - No sharing problems.